June 29, 2005

Testimony of **Dr. Rowan Rowntree** to the U.S. House of Representatives Committee on Government Reform, Subcommittee on Energy and Resources, Darrell Issa, Chairman

Oversight Hearing: "The Next Generation of Nuclear Power"
June 29, 2005, 2:00 p.m.
Room 2203, Rayburn Bldg.

Thank you, Mr. Chairman, Members of the Subcommittee, for your invitation to participate in this important discussion. I would like to address the second question in your Briefing Memorandum, "How can government further promote the development of Generation IV nuclear power technology?"

I understand that Generation IV reactors will be available in 25 years, that they are conceived to be systems that reduce accident potential significantly, that they efficiently produce hydrogen, and can burn reactor waste, minimize uranium use, plutonium proliferation, and significantly reduce the need for repository disposal.

I suggest six things government can do to promote Generation IV technology. These are designed to reduce the public's aversion to nuclear power and have energy policymaking become more transparent. Unless we can achieve these, support for Generation IV reactors will be difficult. These suggestions focus on the interim 25 years until the advanced reactors can come on line.

**First, educate the nation as to why the 100 orders for reactors were cancelled and why there have been no new orders for reactors since 1978.** This is the first step in building public confidence that, with new and advanced technology, the nation can safely consider continuing the nuclear component of our energy program.

**Second, educate the nation as to how safe the current 103 reactors are, at what rate they will be decommissioned, and what type of reactors will replace them.** To maintain the 20% nuclear contribution, tell us if it's better to extend the life of the current fleet, or replace a portion of that fleet with what I assume will be called Generation III reactors. If it is government's intention to increase the

nuclear contribution above 20% during the next 25 years, tell us what kinds of reactors and fuel cyles will be used and what the tradeoffs are between starting these reactors up versus waiting for the Generation IV reactors.

**Third, solve two problems of critical public safety: The disposal question and the posture of the NRC.** Is it better to move high-level waste to Yucca Mt. or improve technology for on-site disposal. Should we get back into reprocessing, and, if so, can we manage the plutonium proliferation problem. Is the Nuclear Regulatory Commission tilted toward public safety or toward industry solvency?

**Fourth, provide the public with a plan and timeline that takes us through the interim 25 years, through the lifespan of Generation IV to fusion.** A plan, in itself, builds confidence, structures discussion, and invites good ideas. For example, the fusion education program at General Atomics, in partnership with DOE, begins at the elementary school level. Education programs like this, when placed in the context of a plan and timeline take on added power and meaning.

**Fifth, make a concerted effort to reduce fossil fuel consumption by strengthening CAFÉ standards and supporting citizens' conservation efforts.** This builds public participation, personal responsibility, and public interest in energy decisions. This approach can convince the public that government is making every effort to solve our energy dilemma. An example is Congressman Issa's efforts to make carpool lanes available to hybrid cars.

**Sixth, and most important, give careful consideration to renewables that can come on line in the next five years to reduce the large fossil fuel component.** Promote solar and take a new look at wind. I've just become more interested in wind, and I'll tell you why. Wind turbines currently contribute only 1% of our electricity. They require low front-end investment, low operational costs, they use established technology, and have low environmental impacts. But, in terms of forging a national generation strategy, we had no hard data on the wind resource. Then, in last month's (May, 2005) issue of the *Journal of Geophysical Research-Atmospheres* (a publication of the American Geophysical Union) there appeared a peer-reviewed research report that establishes a calculus for wind. This study

assesses the wind generation potential for all regions of the world. The lead author is a tenured professor of Civil and Environmental Engineering at Stanford University. The study was funded by NASA. It's solid.

The research concludes that locations around the world with sustainable Class 3 winds can produce about 72 terawatts of electricity. A terawatt is 1 trillion watts, the power equivalent to that generated by more than 500 nuclear reactors. The authors point out that capturing 20% of the 72 terawatts could meet the world's electricity needs including, I presume, a good portion for hydrogen production. The Great Lakes Region is designated in this study as one with many off-shore sites for wind generation, and the availability of fresh water at that site makes it attractive for hydrogen production. I'm concluding, now, that with government leadership and moderate subsidy, we could attract capital to bring additional wind generation on line quicker and with fewer costs, than by building Generation III reactors.

**Summary.** To successfully promote Generation IV reactors requires convincing thought leaders, investors, and governments that: (1) Generation IV solves most of the problems of Generations I, II, and III. (2) That the current reactor fleet will be managed in a way that maximizes public safety. (3) That government is looking at all options in a clear-eyed cost-benefit manner. (4) That government will educate the people about the costs and benefits of each option, then make intelligent decisions about how we get out of this dilemma. This subcommittee is taking the right step towards an open and honest discussion, and I commend the Chairman and the Members. Thank you.

**Dr. Rowntree** just concluded a three-year appointment as Visiting Scholar in the Department of Environmental Science, Policy, and Management, at the University of California, Berkeley. He taught courses in Energy, Technology and Society as Assistant and Associate Professor in the Maxwell School of Public Policy at Syracuse University. Three years ago, he retired from his position as national research program leader in the reseach division of the United States Forest Service. His advanced degrees (M.S., Ph.D) are in the earth sciences, taken from the University of California, Berkeley.